

Static Water Vapor Feed Electrolyzer, Phase I

Completed Technology Project (2009 - 2009)



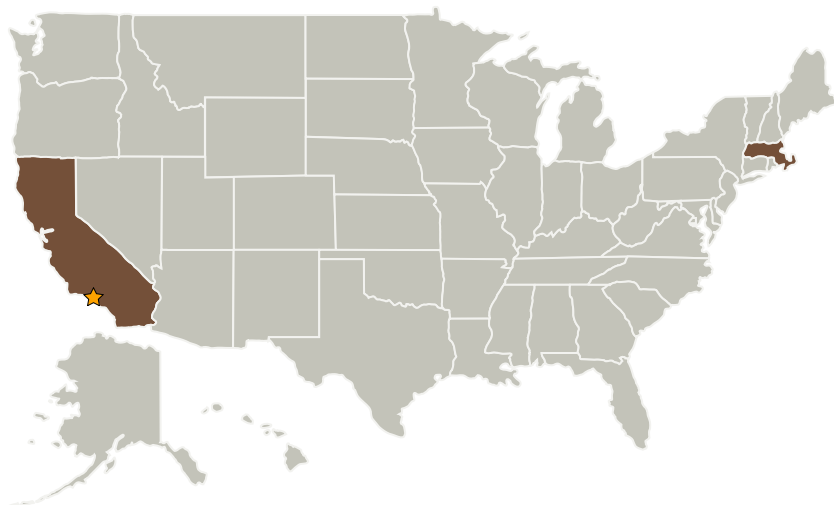
Project Introduction

Development of a static vapor feed electrolyzer utilizing an advanced bipolar plate that produces sub-saturated H₂ and O₂ is proposed. This novel bipolar design can greatly simplify electrolyzer systems, as it eliminates the need for water/gas phase separation, which is particularly challenging in a zero gravity environment. Maintaining water in the vapor phase greatly reduces membrane swelling which should increase durability. Finally, by keeping water in the vapor phase the MEA is not exposed to ion and other contaminants that are carried by a liquid water stream, further increasing durability and simplifying the system by reducing the need for ultra-pure water. The primary goal of this Phase I program then is to demonstrate a high-pressure (1000 psi) static vapor feed electrolyzer and demonstrate that the system can operate without purge of the water feed stream for up to 100 hours.

Anticipated Benefits

Potential NASA Commercial Applications: Fuel cell vehicles hydrogen filling stations, Naval electrolyzers

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
Giner Electrochemical Systems, LLC	Supporting Organization	Industry	Newton, Massachusetts

Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

**January 2009:** Project Start**July 2009:** Closed out**Closeout Summary:** Static Water Vapor Feed Electrolyzer, Phase I Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

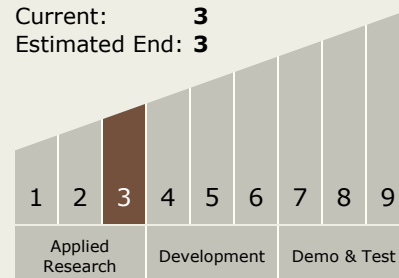
Cortney K Mittelsteadt

Technology Maturity (TRL)

Start: 3

Current: 3

Estimated End: 3



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.1 In-Situ Resource Utilization
 - └ TX07.1.3 Resource Processing for Production of Mission Consumables